Appendix E

Nonpoint Source Pollution Control Documented Needs and Modeled Estimates

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Documented Nonpoint Source Pollution Control Needs

While NPS needs are not within the scope of CWA section 516(b)(1)(B), 41 States and the District of Columbia documented $38.3 billion in NPS needs. This is an increase from the 33 States and the District of Columbia that documented $15.3 billion in NPS needs in the CWNS 2000. Figure E-1 shows the distribution of NPS pollution control needs by State. Table E-1 summarizes the national NPS pollution control needs, while Appendix A, Table A-2, presents these needs by State.

More than 63 percent of the $38.3 billion for NPS pollution control needs were documented by Florida ($9.3 billion), Pennsylvania ($5.9 billion), New Jersey ($3.7 billion), Minnesota ($2.9 billion) and New York ($2.6 billion). Seven States—Missouri, Mississippi, Wisconsin, Ohio, California, Connecticut and Michigan—documented from $1 billion to $1.7 billion each in NPS pollution control needs. Each of 11 other States documented NPS pollution control needs of greater than $0.1 billion.

In some cases, plans already exist to address the documented NPS needs through other Federal or State funding mechanisms.

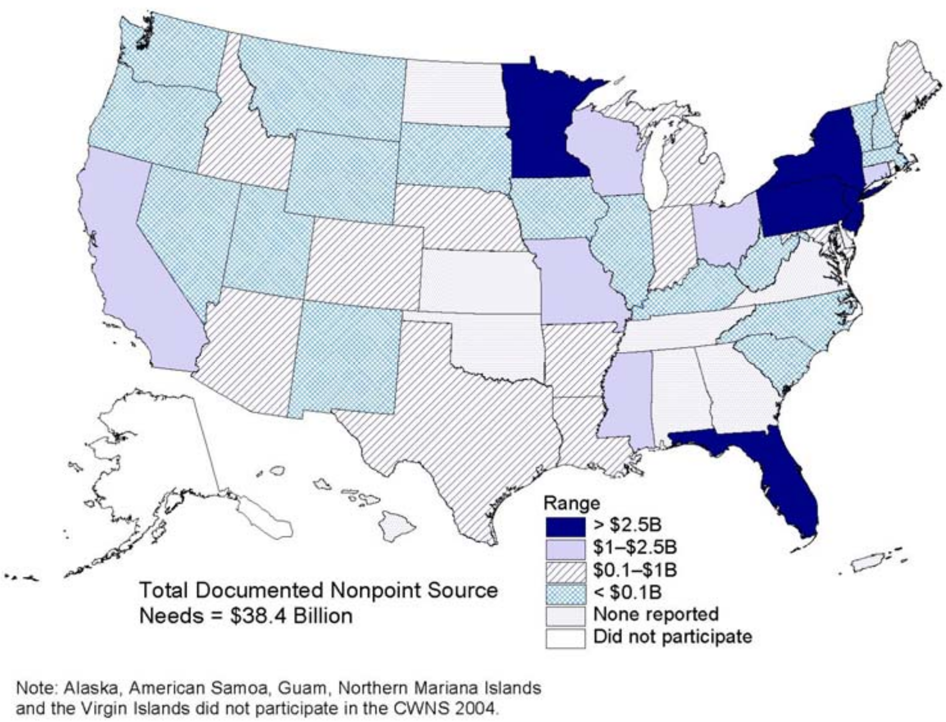

Figure E-1. Distribution of nonpoint source pollution control (Category VII) needs by State (January 2004 dollars in billions).

Urban ($12.4 billion), hydromodification ($9.3 billion), ground water protection ($4.8 billion) and individual/decentralized sewage treatment ($3.0 billion) needs account for 76.8 percent of the total documented NPS needs.

Of the $3.0 billion reported Category VII-L needs, $2.2 billion is for small communities with populations fewer than 10,000 people. Twenty-one new decentralized systems are planned for small communities where abandonment of individual onsite systems is expected. These 21 facilities will serve approximately 19,734 people. Communities are finding that decentralized wastewater systems sometimes prove to be the least-cost permanent solution to protect water quality and public health. Alternatively, communities are also implementing hybrid solutions, which consist of a conventional system for the most concentrated developed areas and decentralized systems for the less densely developed areas. EPA's 2003–2008 Strategic Plan states that decentralized systems are a key component of the Nation's wastewater infrastructure. EPA will provide national direction and support to improve the performance of such systems by promoting the concept of continuous management and facilitating upgraded professional standards of practice.

In addition to the needs reported for individual/decentralized sewage treatment, $5.7 billion of the centralized collection and wastewater treatment plant needs (Categories I through V) are associated with solving individual/decentralized sewage treatment and other NPS problems. Ohio ($1.1 billion), West Virginia ($0.9 billion), Pennsylvania ($0.6 billion) and Arizona ($0.4 billion) account for more than one-half of these needs. Although the $5.7 billion represents only 5.5 percent of the national needs in Categories I, II, IV-A and IV-B, eight States—West Virginia (59 percent), Arkansas (44 percent), Ohio (34 percent), Mississippi (33 percent), Delaware (32 percent), Pennsylvania (31 percent), Nevada (31 percent) and Montana (25 percent)—indicated that more than 25 percent of their Category I, II, IV-A and IV-B needs are associated with solving NPS problems.

In previous surveys, because of the limited availability of NPS needs documentation, EPA developed and applied national models to estimate NPS needs. In the CWNS 1996, EPA reported modeled needs for cropland agriculture, animal agriculture and silviculture. These models relied on data from the National Resources Inventory, the Census of Agriculture and other data sources for estimating the level of needs.

For the CWNS 2000, EPA and the States made a concerted effort to report documented NPS pollution control needs. This effort included identifying six new NPS pollution control needs categories: marinas, resource extraction, brownfields, storage tanks, sanitary landfills and hydromodification. EPA reported only documented NPS needs. However, EPA included in appendices supplementary modeled estimates of NPS needs for urban, marinas, resource extraction and hydromodification in addition to the categories modeled in 1996.

Table E-1. NPS Pollution Control Needs Documented for CWNS 2004 (January 2004 Dollars in Billions)

NPS Pollution Control Need Category	Total Needs ($ B)	Percentage of Total
Agriculture (cropland) (VII-A)	1.7	4.4%
Agriculture (animals) (VII-B)	1.5	3.9%
Silviculture (VII-C)	0.2	0.5%
Urban (VII-D)	12.4	32.3%
Ground water protection: unknown source (VII-E)	4.8	12.5%
Marinas (VII-F)	0.01	< 0.1%
Resource extraction (VII-G)	0.2	0.5%
Brownfields (VII-H)	1.7	4.4%
Storage tanks (VII-I)	1.5	3.9%
Sanitary landfills (VII-J)	2.1	5.5%
Hydromodification (VII-K)	9.3	24.2%
Individual/decentralized sewage treatment (VII-L)	3.0	7.8%
Total NPS needs	**38.3**	

For CWNS 2004, States used a variety of document types to identify needs and costs for NPS projects. The most common document types were Capital Improvement Plans, Intended Use Plans, Final

Engineering Estimates, and Approved State 319 Project Workplans or Implementation Plans. A few States were able to identify needs and costs based on Total Maximum Daily Load (TMDL) Reports and TMDL Implementation Plans. Needs for Category VII-L NPS individual/decentralized sewage treatment were documented through facility plans and engineering reports. States also used community surveys that identified the number of failing septic systems and the average repair and replacement costs. Several States used existing State databases of specific NPS problems (such as miles of streams affected by acid mine drainage, number of leaking storage tanks, or the State 303(d) list) to identify needs. Costs were determined from unit costs developed by State engineers or from State standardized BMP costs.

For this Report, with the exception of agriculture (cropland and animals) and resource extraction, the documented needs now exceed previously modeled estimates from the CWNS 2000. Table E-2 shows a comparison of CWNS 1996 and CWNS 2000 NPS needs with CWNS 2004 documented needs.

Table E-2. Comparison of Total Other Needs for the 1996–2004 CWNS (January 2004 Dollars in Billions)

					'00–'04 change	
Needs Category		**1996**[a]	**2000**[a]	**2004**	**$B**	**%**
VII-A	NPS - Agriculture (cropland)[b]	4.7	0.5	1.7	1.2	240%
VII-B	NPS - Agriculture (animals)[b]	2.6	0.7	1.5	0.8	114%
VII-C	NPS - Silviculture[b]	4.3	0.05	0.2	0.15	300%
VII-D	NPS - Urban	1.2	4.9	12.4	7.5	153%
VII-E	NPS - Ground water protection: unknown source	1.3	1	4.8	3.8	380%
	Estuaries[c]	0.04	--	--	--	NA
	Wetlands[c]	0.01	--	--	--	NA
VII-F	NPS - Marinas	--	0.002	0.01	0.008	400%
VII-G	NPS - Resource extraction	--	0.04	0.2	0.16	400%
VII-H	NPS - Brownfields	--	0.4	1.7	1.3	325%
VII-I	NPS - Storage tanks	--	1.1	1.5	0.4	36.40%
VII-J	NPS - Sanitary landfills	--	2	2.1	0.1	5.00%
VII-K	NPS - Hydromodification	--	4.5	9.3	4.8	107%
VII-L	NPS - Individual/decentralized sewage treatment	--	--	3	3	NA
VIII	Confined animal–point source[d]	--	0	0	0	0%
IX	Mining–point source[d]	--	0	0	0	0%
XI	Estuary management	--	--	0.1	0.1	NA
	Total Needs for Other Categories	14.2	15.2	38.5	23.3	153.5%
	Category VII only	14.2	15.2	38.3	23.2	152.6%

[a] The needs from 1996 and 2000 were inflated to January 2004 dollars for comparison with CWNS 2004 data.
[b] Modeled needs in 1996.
[c] Documented needs for estuaries and wetlands were provided by States during the CWNS 1996, but they are no longer reported as individual categories.
[d] Needs in Categories VIII and IX include activities related to implementing CCMPs.

Although good progress has been made in documenting NPS pollution control projects, there is still significant underreporting, illustrated by the following issues related to individual/decentralized sewage treatment needs. Although the current individual septic system population reported in the CWNS has nearly doubled from 7.7 million in 2000 to 15.6 million in 2004, this represents only approximately one-fifth of the current U.S. population being served by onsite systems. In addition to likely underreporting of septic system needs by local communities, States had difficulty obtaining or using documents that met the CWNS 2004 documentation criteria.

State Modeled Nonpoint Source Pollution Control Estimates

During the CWNS 2004, Iowa, Kansas, Virginia and West Virginia submitted documents supporting the use of various large-scale basin models to justify statewide needs and costs for NPS pollution control and abatement activities. Each State used a unique approach which continues to underscore the significant underreporting of the actual NPS needs in the United States. In addition to these four States, New Jersey used estimated costs for developing and implementing watershed management plans based on available data from completed watershed plans in the State. Each model, while having some interesting technical merit, has aspects such as information that is not site-specific or activities that are not CWSRF eligible, that warrant classifying these approaches as modeled estimates instead of documented needs.

EPA went to great lengths to encourage State CWNS 2004 coordinators to work with their NPS counterparts in the States to document NPS needs. By categorizing these needs as modeled estimates, EPA does not seek to discourage the States from such initiatives and collaboration in identifying NPS needs.

EPA expects that during the preparatory stages for the CWNS 2008, the CWNS National Workgroup will address the issue of States using modeled needs for NPS pollution abatement for future surveys. To that end, strong consideration will be given to improving the methodologies and data sources used in these State efforts to meet CWNS documentation criteria.

The following sections of this appendix present the methodologies that the five States used in estimating their NPS needs. The needs presented here from the five States are reported as Separate State Estimates (SSEs) in Appendix A, Tables A-11 and A-12.

Iowa's Nonpoint Source Needs

Introduction

Iowa is an agriculturally rich State. Over 60 percent of its land is in intensive row crop production, and over 90 percent is in some type of agricultural production, including forage and pastureland. Iowa also leads the Nation in the production of hogs and ranks as one the top 10 States for cattle and poultry production (USDA 2004).

Because of Iowa's naturally rich soils and intensive agricultural production, its streams, rivers and lakes have high levels of nutrients and sediment. Monitoring conducted over the past 5 years showed that 132 of Iowa's larger, publicly owned lakes had median summer total nitrogen (TN), total phosphorus (TP) and chlorophyll *a* levels of 1,550, 89 and 21 parts per billion (ppb), respectively. As a basis of comparison, the EPA Region 7 Regional Technical Advisory Group recommended values of 700, 35 and 8 ppb for TN, TP and chlorophyll *a*, respectively, for lake water quality standards. Monitoring for streams and rivers showed similar results: median all-season values for TN, TP and chlorophyll *a* were nearly three times the criteria recommendations in EPA's ecoregion-based criteria guidance documents.

Iowa's nutrient budget, conducted as part of a multiyear nutrient management strategy, showed that over 90 percent of the nitrogen and over 80 percent of the phosphorus carried by Iowa's streams and rivers come from nonpoint sources, with agriculture being the major nonpoint source. Iowa has also been identified as a major contributor to the Mississippi River nitrogen loads, believed to be a factor in the size of the Gulf of Mexico's hypoxic zone. Sediment also poses a significant water quality problem. The median total suspended solids concentration for 80 monitoring sites on Iowa's streams and rivers is nearly 30 parts per million. Sediment has consistently been identified as a major pollutant for lakes, as well as streams and rivers, and soil erosion from crop fields is closely linked to phosphorus transport to waterbodies.

Full implementation of agricultural BMPs across the State to reduce nitrogen, phosphorus and sediment loading is key to improving Iowa's water quality. This has been recognized for many decades. However, the questions of what BMPs are needed to actually improve water quality statewide and what resources are needed to implement these practices have not been answered with any accuracy.

Methodology

The Iowa Department of Natural Resources (DNR) contracted with Iowa State University's Center for Agriculture and Rural Development (CARD) to assess the level of resources needed to fully implement a suite of common agricultural BMPs across the State and estimate the water quality benefits of the practices. In concept, this approach is similar to the CWA's technology-based approach used for point sources in that the BMPs selected for evaluation were those considered practicable and economically achievable.

CARD combined economic models and data on land use and conservation practices with the Soil and Water Assessment Tool (SWAT), a watershed-based water quality model, to provide estimates of the resources needed and the nutrient and sediment reduction benefits of the BMPs. The BMPs included land set-aside, terraces, no-till and conservation till, contour farming, grassed waterways and nutrient management. Criteria for implementing the BMPs on the land based on practical, realistic expectations of what is achievable were developed. For instance, it was determined that land set-aside would be used to *retire* cropland in riparian corridors and highly erodible areas but that the total set-aside acres would not exceed 10 percent of the total cropland acres because this was thought to be a threshold of public acceptance and economic achievability. All cropland with slopes exceeding 2 percent that were not retired were then placed in conservation tillage (over 30 percent residue) or no till (over 60 percent residue).

The water quality benefits of the BMPs placed on the landscape were estimated using SWAT. Reductions of between 6 to 20 percent for nitrogen, 28 to 59 percent for phosphorus and 6 to 65 percent for sediment from existing baseline conditions were targeted for the 13 watersheds in Iowa. Costs for the various practices were obtained from a variety of sources, such as the Natural Resources Conservation Service's (NRCS) Environmental Quality Incentives Program contracts and NRCS construction contracts. Three types of costs were included in the economic model: (1) incentive costs, which are payments to producers, normally limited to 1 to 3 years, to encourage them to adopt certain practices, especially if the practices involve some perceived economic risk; (2) actual construction costs of the various *hard* practices, such as terraces and waterways; and (3) land set-aside costs for the producer to take land out of row crop production and place it in perennial grasses or other non-crop uses.

An implementation period of 10 years was chosen as a realistic goal to achieve full implementation of the identified set of BMPs. The annualized program costs were then converted to a net present value using an 8 percent discount rate (Table E-3).

Table E-3. Modeled Nonpoint Source Needs Identified for Iowa (January 2004 Dollars)

Facility Name[a]	Total NPS Needs ($K)	VII-A ($K)
98 facilities in 13 large watersheds throughout Iowa	11,145,050	11,145,050

[a] Because needs presented in the CWNS 2004 Database are identical for all 98 facilities, it is not possible to aggregate the dollar amount in a reasonable manner at the 8- or 6-digit HUC level.

Kansas' Nonpoint Source Needs

Introduction

Kansas has a land area of 81,407 square miles and is drained by 12 major river basins. Land use in the State is primarily agricultural, with 64,414 farmsteads throughout the State. Approximately 47,227,944 acres of land is in farms, and the average farm size is 733 acres. Unfortunately, geolocational and NPS needs data are not available for most of the farmsteads in Kansas. However, some needs survey information was compiled on a countywide basis. Subsequently, the Kansas Department of Health and Environment (KDHE), Bureau of Water, Watershed Management Section, used existing data to complete needs surveys for each of the 105 counties in Kansas. Statewide totals were also estimated. The following is a summary of inventory categories, associated data sources and assumptions used to complete this survey.

Methodology

Acres of Crop, Pasture and Range Land Needing Treatment. Approximately 58 percent of the total land acres in Kansas are used for row crop agriculture. Row crop agriculture contributes a significant amount of silt, pesticides and nutrients into the State's surface waterbodies. In 1997 the NRCS updated the National Resources Inventory (NRI), which quantifies the number of acres of cropland. Agricultural experts in Kansas determined the percentage of land reported in the NRI needing treatment for a given county. The Kansas State Conservation Commission (SCC) administers a portion of the State Water Plan Fund for cost sharing on certain conservation practices. As part of the cost-share program, the SCC tracks land treatment costs by county. Land *treatments* may include conservation measures such as terraces, grass waterways, and buffer strips. According to the SCC, the average cost to treat an acre of land is approximately $125.

The NRI also quantifies the number of acres of pasture and rangeland. Agricultural experts in Kansas determined the percentage of pasture and rangeland reported in the NRI needing treatment. Many BMPs and water quality protection measures can help improve the quality of runoff from rangeland and pasture land. According to the SCC, the most common treatment for rangeland and pastureland is the creation of alternative water supplies. The SCC estimates that the average cost to provide alternative water supplies in Kansas is approximately $25 per acre.

Livestock Facilities Requiring Treatment. The Watershed Management Section focused on quantifying the nonpoint source abatement needs for cow/calf, beef cow and milk cow (dairy) operations. The nonpoint source abatement needs for these types of facilities are extremely diverse. Some small livestock facilities might need only a grass filter strip or alternative water supply, whereas other facilities might require a total waste containment system (lagoon) or change in management practices. There is no accurate statewide inventory of nonpoint source abatement needs for livestock facilities. The NRI, however, does include a county-specific inventory of cow/calf, beef cow and milk cow farms. To conservatively account for livestock facilities in this needs inventory, it was assumed that each livestock facility in a given county required at least one water quality protection measure, structure, or BMP to abate nonpoint source pollution. According to the SCC, $12,000 is the average cost to treat large livestock facilities. It is assumed that large livestock facilities will require a structural waste containment system or a lagoon. Often small livestock facilities can be treated by changing management practices, adding buffer strips, or both. The average cost to treat small livestock facilities can vary dramatically. Nemaha County has estimated that small livestock facilities could be treated at an average cost of $3,000. To account for all livestock facilities (regardless of size) that need treatment, the Nonpoint Source Section decided to average SCC's treatment costs, which is $7,500.

Failing Septic Systems. To complete this needs inventory, the following protocol was developed for estimating the number of failing septic systems in a given county. U.S. Census data were reviewed to determine the rural population in a given county. The U.S. Census data also indicated that there are approximately three persons per rural household. By dividing the rural population by three, the number of rural households was estimated for a given county. It was assumed that most of rural households use septic systems. On the basis of Local Environmental Protection (LEP) program data, it was also assumed that there is a statewide average septic system failure rate of 40 percent. The total number of septic systems (equal to the number of rural households) was then multiplied by 0.40 to determine the number of failing septic systems in a given county. According to the KDHE’s LEP program, the statewide average cost to upgrade or replace a failing septic system is approximately $4,500 per household.

Hydromodification (Stream Miles Needing Treatment). Hundreds of miles of Kansas stream and river corridors are in a degraded condition. Many factors can degrade the condition of a stream corridor, including lack of riparian vegetation, development and increased runoff within the watershed, and farming up to the edge of the stream. For this needs inventory, the Nonpoint Source Section assumed that approximately one-eighth of the State’s stream miles are degraded and in need of treatment. *Treatment* for degraded streams may include stream bank stabilization structures and riparian enhancement and restoration. GIS data were used to calculate the total number of perennial stream miles in a given county, and then that number was divided by 8 to determine the number of stream miles needing treatment. Both the SCC and KDHE’s Watershed Management Section have programs that focus on riparian restoration and protection. On the basis of past project experience, the SCC estimates that stream banks can be stabilized at an estimated average cost of $15 per linear foot. Thus, it would cost approximately $79,200 to treat one mile of stream.

Table E-4 presents the nonpoint source needs identified for the different CWNS 2004 cost categories for Kansas.

Table E-4. Modeled Nonpoint Source Needs Identified for Kansas (January 2004 Dollars)

Watershed	VII-A ($K)	VII-B ($K)	VII-K ($K)	VII-L ($K)
Missouri-Nishnabotna	36,827	24,633	9,132	16,329
Republican	173,753	68,206	37,825	21,633
Smoky Hill	363,558	148,691	79,280	57,700
Kansas River Basin, excluding the Big Blue, Republican and Smoky Hill River Basins	85,624	94,927	38,515	90,540
Big Blue River Basin	32,966	27,778	12,924	21,429
Osage River Basin	57,406	66,995	20,852	36,509
Middle Arkansas	663,919	148,342	70,429	129,747
Upper Cimarron	203,891	30,699	10,079	14,335
Arkansas-Keystone	120,931	64,109	28,436	30,239
Verdigris River Basin	35,443	53,452	23,525	21,773
Neosho River Basin	136,744	103,197	41,620	58,058
Total	**1,911,062**	**831,029**	**372,617**	**498,292**

New Jersey's Nonpoint Source Needs

Introduction

Over the past several years, EPA has issued guidance on the development of complete watershed-based plans throughout the Nation. For a watershed-based plan to be considered complete, it must contain at least nine predefined components. Those components are the foundation on which NPS pollution control needs can be determined and implemented for the given watershed.

The specific needs for implementing watershed-based plans in New Jersey were taken from the *Strategic Water Quality Improvement Plan for Surface Water Quality Impairments of the Long Swamp Creek Watershed*, prepared in April 2003. This approved plan for the Long Swamp Creek watershed (LSCW) is the most thorough approved plan that New Jersey has available at this time. Many other plans were carefully perused and considered. However, no other plans provided sufficient detail on projects that need to be implemented (type and number) to enable making the necessary determinations on a statewide level.

Methodology

New Jersey estimated the costs to develop watershed-based plans on the basis previously funded watershed-based planning efforts, such as Regional Stormwater Management Plan grants funded under the SFY 2004 section 319(h) pass-through grant program and proposals for watershed-based plans received for the SFY 2005 319(h) pass-through grant program. These plans included the nine minimum components specified in EPA's *Supplemental Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories in FY 2000.* The total project cost, including in-kind match, was divided by the number of square miles covered by the project to obtain the cost per square mile. The costs per square mile for all the projects were then averaged to obtain the cost per square mile to develop a watershed-based plan. Once the average cost per square mile was determined, the cost was applied to the square mileage of each Watershed Management Area (WMA) in the State.

New Jersey estimated the costs to implement previously approved watershed-based plans that do not meet all of EPA's watershed-based planning requirements but are robust enough for determining NPS pollution control needs. The most thorough approved plan was used as the basis for the specific needs for implementation of watershed-based plans. The watersheds in New Jersey differ in NPS needs and the methods used to address the needs. Consequently, some needs shown in the selected plan do not exist in all watersheds throughout the State. However, those watersheds have needs specific to them that are not reflected in the selected plan. Therefore, the unique needs for the selected plan can be taken into consideration and costs applied across the State without compromising the accuracy of the cost estimates.

Nine categories of projects identified from the selected plan address NPS pollution control. They are Inlet Filters, Riparian Buffer Development, Education & Outreach Activities, Open Space and Riparian Corridor Preservation, Stormwater BMPs, Oil Skimmers, Sampling/monitoring, Goose Management, and Stream bank Stabilization. To determine the cost to implement a previously approved watershed-based plan, the costs for each project category were added. The result was a cost of $5,996,534. The selected plan addresses an area of 6.3 square miles. Therefore, the cost per square mile, rounded to the nearest hundred, is $951,800.

Because watershed-based plans do not precisely fit into any one NPS category used for the CWNS 2004, the best categories in which to place these needs are VII-A NPS agriculture (cropland), VII-D NPS urban, and VII-E NPS ground water, depending on the land use types present. The most recently available New Jersey Department of Environmental Protection (NJDEP) GIS land use coverages for each WMA were used to separate land uses into urban, agricultural, and ground water categories. Any non-agricultural land uses were combined into the urban category. All land uses in the Pinelands area were placed in the ground water category, but no land uses outside the Pinelands were included in this category. The WMAs with significant sections in the Pinelands are WMAs 13, 14, 15, 16, 17, 19 and 20. An assumption was made that an equal amount of agricultural and urban land uses in each WMA are within the Pinelands. For example, if half of the WMA is in the Pinelands, it is assumed that half of the agriculture land use in that WMA is in the Pinelands and half of the urban land use in the WMA is in the Pinelands.

To extrapolate the plan implementation costs to the State level, GIS coverages were used to determine the square miles in each WMA. Thus, the cost for plan implementation in the entire WMA could be determined. Table E-5 provides the costs to implement a watershed-based plan in each WMA and breaks the costs down into the CWNS 2004 categories of VII-A NPS agriculture (cropland), VII-D NPS urban, and VII-E NPS ground water.

Table E-5. Estimated Nonpoint Source Needs Identified for New Jersey (January 2004 Dollars)

Name of Watershed Management Area (WMA)	VII-A ($K)	VII-D ($K)	VII-E ($K)
WMA 1 - Upper Delaware	159,780	567,142	
WMA 2 - Wallkill	42,277	160,876	
WMA 3 - Pompton, Pequannock, Wanaque, Ramapo	1,485	230,386	
WMA 4 - Lower Passaic, Saddle	369	183,387	
WMA 5 - Hackensack, Hudson, Pascack	481	160,405	
WMA 6 - Upper & Mid Passaic, Whippany, Rockaway	10,109	342,266	
WMA 7 - Arthur Kill	154	174,866	
WMA 8 - North & South Branch Raritan	136,675	319,826	
WMA 9 - Lower Raritan, South River, Lawrence	36,604	306,164	
WMA 10 - Millstone	95,770	181,656	
WMA 11 - Central Delaware	98,525	166,539	
WMA 12 - Monmouth	56,165	397,130	
WMA 13 - Barnegat Bay	9,443	425,197	333,499
WMA 14 - Mullica	7,108	185,042	553,694
WMA 15 - Great Egg Harbor	10,088	114,143	487,123
WMA 16 - Cape May	16,008	235,538	74,549
WMA 17 - Maurice, Salem, Cohansey	289,603	779,369	133,203
WMA 18 - Lower Delaware	138,825	242,666	
WMA 19 - Rancocas	6,698	58,510	276,770
WMA 20 - Assiscunk, Crosswicks, Doctors	81,329	103,901	61,378
Total	**1,197,496**	**5,335,009**	**1,920,216**

Virginia's Nonpoint Source Needs

Introduction

Approximately 52 percent of the Commonwealth of Virginia's land mass lies within the Chesapeake Bay basin, representing 34 percent of the entire basin. Four major river basins—the Shenandoah–Potomac, Rappahannock, York, and James—as well as the bayside rivers and creeks of the Eastern Shore (the Delmarva Peninsula) make up the bay's drainage area within Virginia. Consistent with the objective of reducing nutrients and sediments in the five tributary basins of the Chesapeake Bay watershed in Virginia, the EPA's Chesapeake Bay Program and the Commonwealth of Virginia developed a model to estimate the cost for implementing nonpoint source controls. It is anticipated that a successful nutrient and sediment reduction strategy will have significant beneficial effects on water quality in the creeks, streams, rivers and coastal embayments that feed the lower Chesapeake Bay and result in healthy and abundant populations of fish, shellfish, aquatic plants and other organisms. A total of $6.5 billion in capital costs were estimated using the modeling approach among the following NPS cost categories: agriculture (cropland) (VII-A), agriculture (animals) (VII-B), silviculture (VII-C), urban (VII-D), hydromodification (VII-K) and individual/decentralized sewage treatment (VII-L).

Methodology

Using the Chesapeake Bay Watershed and Water Quality Models, nutrient and sediment load reduction goals were determined for the Bay to meet new water quality criteria. Virginia's new allocations for nitrogen and phosphorus are 51.4 million and 6 million pounds per year, respectively. These allocations compare with the estimated nitrogen and phosphorus loadings in 2002 of 77.8 and 9.84 million pounds per year. Sediment loadings were set to 1.94 million tons per year, in comparison to the 2.38 million tons estimated in 2002. To meet these allocations, several pollution control management actions that integrated point and NPS controls were analyzed with the models. Separate guidelines were developed to achieve the reductions in nutrient and sediment originating from point and NPSs. This analysis included an assessment of BMP implementation through 2002 (i.e., cropland acreage with nutrient management plans) and the 2010 BMP implementation goal to achieve the reduction goals. The difference between the 2010 BMP goal and the 2002 progress is the basis for estimating costs. The NPS control strategy calls for installing and maintaining BMPs on 92 percent of all available agricultural lands, 85 percent of all mixed open lands, 74 percent of all urban lands and 60 percent of all septic systems within the Virginia portion of the Chesapeake Bay watershed. For example, on the 2.87 million acres of treatable agricultural acres (hay, pasture and cropland), the plan calls for an additional 0.4 million acres of tree planting or implementation of forested buffers along streams. Multiplying this acreage by the unit cost information yielded $0.37 billion in capital costs. Similarly, 1.70 million acres of urban land and 1.55 million acres of mixed open acres were identified within the Bay area for the installation of selected BMPs.

Table E-6 presents the NPS needs identified for the four major river basins and bayside rivers and creeks of the Eastern Shore. Note that a portion of the modeled cost estimates for urban runoff also includes costs associated with municipalities covered by EPA's MS4 program and would not be tracked as an NPS need.

Table E-6. Modeled NPS Needs Identified for the Chesapeake Bay Watershed within Virginia (January 2004 Dollars)

River Basin Name	Total NPS Needs ($K)	VII-A ($K)	VII-B ($K)	VII-C ($K)	VII-D[a] ($K)	VII-K ($K)	VII-L ($K)
Shenandoah/Potomac Basin	2,494,886	157,039	75,731	187	2,197,992	28,395	35,542
Rappahannock Basin	487,234	27,824	31,262	187	412,474	8,940	6,547
York Basin	460,860	25,635	10,631	374	412,474	4,263	7,483
James Basin	3,043,008	193,571	69,255	935	2,731,122	28,483	19,642
Eastern Shore Watershed	56,159	5,889	502	37	42,089	6,800	842
Total	**6,542,147**	**409,958**	**187,381**	**1,720**	**5,796,151**	**76,881**	**70,056**

[a] Includes costs associated with municipalities covered by EPA's MS4 program.

West Virginia's Nonpoint Source Needs

Introduction

The Chesapeake Bay drainage area of West Virginia contains the counties of Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, Pendleton, Preston and Tucker. Berkley, Jefferson and Morgan counties on the eastern side of the State cover a land area of 763 square miles in the fastest growing region in the State. Much of this area is being rapidly transformed into a bedroom community of the Washington-Baltimore Metropolitan region. To the west, the five-county area of Hampshire, Hardy, Grant, Mineral and Pendleton counties, with a land area of 2,722 square miles, is dominated by agriculture. Large-scale poultry production and processing facilities, as well as a robust beef and cattle market, predominate Preston and Tucker counties and contribute less than 0.5 percent of West Virginia's total potential nutrient and sediment load.

The Potomac River forms portions of the Maryland–West Virginia boundary (east-west boundary). The North Branch of the Potomac makes up the western half of the boundary until it combines with the South Branch, which is almost entirely in West Virginia, except for its headwaters. The watershed of the North Branch and the combined Potomac River are split between Maryland and West Virginia. The Chesapeake Bay Program has determined that the Potomac River is one of the many rivers that contribute excess nutrient and sediment loads to the bay. To correct this problem nitrogen, phosphorus and sediment loading allocations for each State were evaluated, negotiated and finally agreed upon by each of the Chesapeake Bay watershed States.

The West Virginia Department of Environmental Protection, in partnership with West Virginia Conservation Agency and West Virginia Department of Agriculture, developed the West Virginia Potomac Tributary Strategy to achieve the desired load reductions in nutrients and sediments. Together with other partner States in the Chesapeake Bay Watershed, West Virginia has targeted load reductions of 33 percent for nitrogen, 35 percent for phosphorus and 6 percent for sediment between 2003 and 2010.

Methodology

A watershed-based model, developed for achieving predetermined load reductions for nitrogen, phosphorus and sediment, together with performance data for BMPs in place in West Virginia, is used to determine the type and number of BMPs necessary to achieve the targeted reductions. To reduce the amount of sediment and nutrient loading from urban and mixed open sources, the West Virginia Potomac Tributary Strategy proposed to implement urban nutrient management for 40 percent of urban and 25 percent of mixed open lands by 2010. Cost estimates were developed for the different CWNS 2004 NPS cost categories.

Table E-7 presents the NPS needs identified for the Potomac Tributary.

Table E-7. Modeled NPS Needs for the Chesapeake Bay Watershed within West Virginia (January 2004 Dollars)

Watershed	VII-A ($K)	VII-B ($K)	VII-D ($K)	VII-K ($K)
Potomac River Tributary	2,780	13,863	96,610	1,701

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